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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,520	12/30/2003	Irene Spitsberg	129968	7282
49305	7590	08/24/2006	EXAMINER	
JAGTIANI + GUTTAG 10363-A DEMOCRACY LANE FAIRFAX, VA 22030			IVEY, ELIZABETH D	
			ART UNIT	PAPER NUMBER

1775

DATE MAILED: 08/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/748,520

Applicant(s)

SPITSBERG ET AL.

Examiner

Elizabeth Ivey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,6-12,16-25 and 28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-12,16-25 and 28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Calculation Spreadsheet</u>            |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 6-12, 16-25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application 20030224200 A1 to Bruce.

Regarding claims 1-2, 6-12, 16-18, 20-25 and 28, the examiner interprets mol percentages claimed by applicant to be mol percentages of the ceramic composition as indicated above. Bruce discloses a ceramic thermal barrier coating deposited by physical vapor deposition on a superalloy engine component such as a blade (airfoil), the thermal barrier coating comprising yttria stabilized zirconia having 1-10wt% yttria and 0.1 to 4wt% lanthana creating a

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composition which when calculated into mol% readily overlaps the ranges of at least about 91 mol% zirconia and about 92-95 mol% zirconia, about 4-6 mol% yttria and about .8-2 mol% lanthana with a total stabilizer component of about 5-8 and about 5.5-6.5 mol% and where the mol% ratio of lanthana to total stabilizing component is from about 0.15 to about 0.35 and about .2 to about .3 (page 2 paragraphs [0010], [0015] and [0016] and page 3 paragraph [0023]). The overlapping ranges create a composition of from between about 87-91 wt% zirconia, 7-9.5wt%  $Y_2O_3$  and 2.2-4.5 wt%  $La_2O_3$ . Bruce discloses a bond coating overlying the substrate and adjacent to the thermal barrier coating (page 2 paragraph [0016] and figure 2). Bruce discloses a (strain tolerant) columnar thermal barrier coating with a thickness of 75-300 micrometers and 110-120 microns overlapping 1-100mils and 3-15 mils page 3 paragraphs [0019] and [0023]). Although Bruce does not show express examples of compositions falling within the claimed ranges, Bruce does overlap the claimed ranges and discloses that the compositions are used to produce desirable thermal cycle fatigue lives and thermal conductivities, therefore it would have been obvious to a person having ordinary skill in the art at the time of the invention to have selected the overlapping portion of the ranges disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, *In re Malagari*, 182 USPQ 549. Additionally "The normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages." *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809(CCPA 1969).

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Regarding claim 19, Bruce discloses all of the limitations of claim 18. Although Bruce does not expressly disclose a turbine shroud with a thermal barrier coating thickness of 30-70 mils Bruce does disclose the thermal barrier coating for a turbine shroud, said coating having an intended thickness sufficient to provide required thermal protection for the underlying substrate (page 2 paragraphs [0015] and [0017]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to adjust the thermal barrier coating thickness for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### *Response to Arguments*

Examiner acknowledges applicant's amendments to claims 1, 6, 8, 16, 21 and 25 and finds applicant's arguments regarding the further 112 rejections persuasive. Accordingly, examiner withdraws the associated 112 rejections.

Applicant's arguments filed June 7, 2006 have been fully considered. Applicant's arguments, with respect to the rejections of claims 1-2, 6-12, 16-18, 20-25 and 28 under 35 USC 102 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn but the arguments regarding the 103 rejections are not persuasive.

Regarding the 102 rejections, because no specific examples of the combination of the claimed ranges are provided in Bruce, the examiner withdraws the 102 rejections.

Regarding the 103 rejections and applicant's argument that the reason for rejection was not clearly explained, the examiner points out that the rejection indicates that Bruce discloses a ceramic thermal barrier coating deposited by physical vapor deposition on a superalloy engine component such as a blade (airfoil), the thermal barrier coating comprising yttria stabilized zirconia having 1-10wt% yttria and 0.1 to 4wt% lanthana (page 3 paragraph [0023]). Bruce even indicates that upto 5 wt% of lanthana additions is acceptable. Bruce's disclosure creates a compositions which when calculated into mol% readily overlap the ranges of at least about 91 mol% zirconia and about 92-95 mol% zirconia, about 4-6 mol% yttria and about .8-2 mol% lanthana with a total stabilizer component of about 5-8 and about 5.5-6.5 mol% and where the mol% ratio of lanthana to total stabilizing component is from about 0.15 to about 0.35 and about .2 to about .3. As the examiner indicates the weight percentages of  $Y_2O_3$  and  $La_2O_3$  of Bruce were converted to mol percentages. Within the range of possible combinations of these percentages lie combinations of mol percentages and mol ratios overlapping those of the instant claims. The examiner also indicated that the overlapping ranges create a composition of from between about 87-91 wt% zirconia (a resultant of the ranges disclosed by Bruce), 7-9.5 wt%  $Y_2O_3$  (a portion of the range disclosed by Bruce) and 2.2-4.5 wt%  $La_2O_3$  (a portion of the range disclosed by Bruce). This coincides with a 93-95 mol% zirconia (within the claimed range), 4-5.5mol% yttria (within the claimed range), and 1-2 mol% lanthana (within the claimed range) combination resulting in a mol% ratio of lanthana to total stabilizing component within the

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claimed range, which is defined by the composition itself. Therefore the ranges disclosed by Bruce are overlapping the instantly claimed ranges. The examiner has included a spreadsheet, which further illustrates the overlap. Although specific examples of the claimed ranges showing the exact combinations claimed is not offered the ranges are offered in concert with one another rendering any composition within those ranges obvious to a person having ordinary skill in the art as indicated above absent any convincing showing of unexpected results.

Regarding claim 19, examiner has indicated that Bruce discloses the use of the disclosed coating for a shroud (paragraph [0015]) and further discloses that the TBC is intended to be deposited to a thickness that is sufficient to provide the required thermal protection for the underlying substrate. The examiner asserts that a person having ordinary skill in the art would be motivated to determine an optimal thickness for such a coating and it would be obvious to adjust the thermal barrier for the intended application. Bruce discloses the claimed invention except for thickness. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the thickness, since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

*Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Ivey whose telephone number is (571) 272-8432. The examiner can normally be reached on 7:00- 4:30 M-Th and 7:00-3:30 alt. Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.




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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Elizabeth D. Ivey



JENNIFER C. MCNEIL  
SUPERVISORY PATENT EXAMINER  
8/20/06

Ceramic composition mol% to wt% calculations spreadsheet

	Wt/mol
ZrO2	123.2
Y2O3	225.8
La2O3	325.8
total Wt	674.8

		Mol%	Wt%	Mol%	Wt%	Mol%	Wt%	Mol%	Wt%	Mol%	Wt%
ZrO2											
Y2O3											
La2O3											
A/B ratio											
Total											
ZrO2										92	84.96%
Y2O3										6	10.15%
La2O3										2	4.88%
A/B ratio										0.25	
Total										100	100.00%
ZrO2						93	86.55%	93	86.88%		
Y2O3						5	8.53%	5.5	9.42%		
La2O3						2	4.92%	1.5	3.71%		
A/B ratio						0.286		0.214			
Total						100	100.00%	100	100.00%		
ZrO2				94	88.50%	94	88.84%				
Y2O3				4.5	7.76%	5	8.66%				
La2O3				1.5	3.73%	1	2.50%				
A/B ratio				0.25		0.167					
Total				100	100.00%	100	100.00%				
ZrO2		95	90.50%								
Y2O3		4	6.98%								
La2O3		1	2.52%								
A/B ratio		0.2									
Total		100	100.00%								
ZrO2											
Y2O3											
La2O3											
A/B ratio											
Total											